



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Applicant : Roy Auerbach, Joachim Bunkenburg, Brahim Dahmani,
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Serial No. : 10/069,695
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For : SCREEN FOR REAR PROJECTION DISPLAY
Examiner : C. Mahoney
Group : 2851

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Attention: Board of Patent Appeals and Interferences

APPELLANT'S BRIEF (37 CFR 1.192)

This brief is in furtherance of the Notice of Appeal filed in this case on March 3, 2004.

Pursuant to 37 CFR §1.192(a), the brief is transmitted in triplicate and is accompanied by the fee set forth in 37 CFR §1.17(c). If any additional fees are required, the Director is hereby authorized to charge such fees to Deposit Account No. 11-1158.

The brief contains the following items under the following headings and in the order set forth below (37 CFR 1.192(c)):

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Submitted herewith is a petition under 37 CFR §1.136(a) and the required fee requesting a two month extension in which to file this brief. No further extension of time is believed to be necessary for this submission, but if such an extension of time is required, appellant requests that this be considered a petition therefor. The Director is hereby authorized to charge any fees which may be required for such an extension to Deposit Account No. 11-1158.

I. REAL PARTY IN INTEREST

The real party in interest is Corning Incorporated, a New York corporation having a place of business at 1 Riverfront Plaza, Corning, New York 14831.

II. RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences.

III. STATUS OF CLAIMS

The status of the claims of this application is as follows:

Claims	Status
1-13 and 15-20	Finally rejected on October 29, 2003, and the subject of this appeal.
14	Cancelled (limitations incorporated into independent Claim 13 by appellant's 7/15/03 Amendment).

IV. STATUS OF AMENDMENTS

No amendments have been filed subsequent to the final rejection.

V. SUMMARY OF THE INVENTION

This invention relates to rear screen projection systems and, in particular, to rear projection screens for use in such systems.

A rear screen projection system includes, inter alia, an object (e.g., a CRT, LCD, or DLP display), a projection lens, and a rear projection screen. The projection lens forms an image of the object on the screen for viewing by a user.

Each of the independent claims of this application, i.e., Claims 1 and 13, define an important relationship between the system's projection lens and its screen.

Specifically, these independent claims specify that:

- (1) the projection lens has an exit pupil (23); and
- (2) the screen comprises a Fresnel structure (11), a lenslet array (13), and an opaque layer (15) which comprises a plurality of holes, wherein the holes are at locations which correspond to the images of the projection lens' exit pupil (23) formed by the combination of the Fresnel structure (11) and the lenslet array (13).

This relationship between the exit pupil (23) of the projection lens and the holes of the opaque layer (15) results in low losses for light propagating from the projection lens to viewer space and high loss for light propagating in the reverse direction (see, for example, appellant's summary of the benefits of the invention at page 6, lines 20-23, of the specification).

Appellant's dependent claims further define various important features of the invention. For example, dependent Claims 11 and 12 define the size of the elements (19) which make up the screen's lenslet array (13). In particular, these claims require that the elements (19) be at least several times smaller than the magnified image at the lenslet array of an individual pixel (21) for an object which is pixelized (Claim 11) or at least several times smaller than a dot spot in the case of an object which is a cathode ray tube (Claim 12). In this way, moiré effects are eliminated (see, for example, appellant's specification at page 4, lines 22-27, and page 6, line 18).

Dependent Claims 5 and 18 also address important features of the elements (19) which make up lenslet array (13). In particular, these claims require that the elements have a rectangular aperture (see Figure 4) and vertical and horizontal clear apertures (CA_v and CA_H) which provide different vertical and horizontal half fields of view for a common focal length (f) of the lenslets in the horizontal and vertical directions. Such elements allow for full control of the vertical and horizontal fields of view in viewer space with a simple lenslet structure (see, for example, appellant's specification at page 5, lines 10-18, and page 6, line 19).

Finally, dependent Claim 10 is directed to the specific screen structure illustrated in Figure 1. As shown therein, the screen preferably includes a protective layer having a smooth outer surface (17) and is composed of two subassemblies: a first subassembly which comprises the Fresnel structure (11) and the lenslet array (13) and a second subassembly which comprises the opaque layer (15) and the protective layer. This arrangement can facilitate the manufacture of the screen and produces a robust structure which can resist environmental damage (see, for example, page 4, lines 14-21, and page 6, line 23, of appellant's specification).

VI. ISSUES

(1) Whether appellant's drawings, specifically, Figure 3, show an opaque layer having holes at locations which correspond to the images of a projection lens' exit pupil formed by a Fresnel structure and a lenslet array (37 CFR §1.83(a)).

(2) Whether Claim 1 claims a projection lens (35 USC §112, ¶2).

(3) Whether the exit pupil referred to in Claims 1 and 13 is the projection lens' exit pupil (35 USC §112, ¶2).

(4) Whether the phrase "said holes being at locations which correspond to the images of the exit pupil formed by the combination of the Fresnel structure and the lenslet array" used in Claims 1 and 13 refers to a point or an area (35 USC §112, ¶2).

(5) Whether Claims 1, 6-7, 11-13, and 19 are unpatentable under 35 U.S.C. §102(b) over van de Ven, U.S. Patent No. 4,666,248 (van de Ven).

(6) Whether Claim 7 is unpatentable under 35 U.S.C. §103(a) over van de Ven.

(7) Whether Claims 2-5, 11-12, 15-18, and 20 are unpatentable under 35 U.S.C. §102(b) over van de Ven in view of Guzman, U.S. Patent No. 4,184,762 (Guzman).

VII. GROUPING OF CLAIMS

Claims 1 and 13 are the independent claims in this application and thus the arguments set forth below regarding these claims apply to all of the claims on appeal.

Additional arguments, beyond those applicable to Claims 1 and 13, apply to dependent Claims 11 and 12, dependent Claims 5 and 18, and dependent Claim 10, and those arguments are set forth below.

Accordingly, for the purposes of this appeal, the following groups of claims stand or fall together:

- (1) Claims 1, 2-4, 6-9, 13, 15-17, and 19-20;
- (2) Claims 11 and 12;
- (3) Claims 5 and 18; and
- (4) Claim 10.

VIII. ARGUMENTS

A. THE EXAMINER ERRED IN OBJECTING TO APPELLANT'S DRAWINGS

In the October 29, 2003 final Office Action, the Examiner objected to appellant's drawings under 37 CFR §1.83(a) as allegedly not showing an "opaque layer comprising holes at locations corresponding to images from [sic; of] the exit pupil of the projection lens formed by the Fresnel and lenslet array combination..." (10/29/03 Office Action at page 2.) In particular, the Examiner stated that "Figure 3 appears to show holes being at the focal point of the Fresnel lenslet array combination."

In fact, Figure 3 does show holes at locations corresponding to images of the exit pupil of the projection lens formed by the Fresnel and lenslet array combination. In particular, it shows such holes for the particular spacing (preferred spacing) between the exit pupil and the Fresnel structure which Figure 3 illustrates.

Thus, as discussed at page 4, lines 29-31, of appellant's specification, in Figure 3, the "Fresnel structure ... has a front focal distance equal to the distance from the exit pupil of the projection lens to the screen." Consequently, as shown in Figure 3, "after refraction on the Fresnel structure, the light becomes parallel to the optical axis as shown at 27." (See page 4, line 31, to page 5, line 2, of the specification.) Because the light is parallel, "[e]ach element of the lenslet array focuses the light in its back focal plane." (See page 5, lines 2-3, of the specification.)

Accordingly, the Examiner is correct that in Figure 3, the holes are shown "at the focal point [sic; back focal plane] of the Fresnel lenslet array combination." However, rather than leading to the conclusion that the drawings do not illustrate a feature of the invention, this observation by the Examiner actually supports the conclusion that this feature has been illustrated. Specifically, the Examiner's observation supports this conclusion because for the preferred spacing between the exit pupil and the Fresnel

structure illustrated in Figure 3, the images of the exit pupil are in the back focal plane of the Fresnel lenslet array combination, as shown in that figure.¹

In view of these considerations, appellant respectfully submits that the Examiner has committed error in objecting to the drawings of this application under 37 CFR §1.83(a) and accordingly that objection should be reversed.

B. THE EXAMINER ERRED IN REJECTING APPELLANT'S CLAIMS 1-13 AND 15-20 UNDER 35 USC §112, SECOND PARAGRAPH

In the October 29th final Office Action, the Examiner raised three §112, ¶2 issues:

- (1) whether Claim 1 claims a projection lens;
- (2) whether the exit pupil referred to in Claims 1 and 13 is the projection lens' exit pupil; and
- (3) whether the phrase "said holes being at locations which correspond to the images of the exit pupil formed by the combination of the Fresnel structure and the lenslet array" used in Claims 1 and 13 refers to a point or an area.

With regard to the first issue, Claim 1 reads as follows:

1. A rear projection screen for use with a projection lens which has an exit pupil, said screen having a light entering side and a light exiting side and comprising in order from said light entering side to said light exiting side:

- (a) a Fresnel structure;
- (b) a lenslet array; and

¹To provide a manageable drawing, only rays emanating from an on-axis point at the center of exit pupil 23 are shown in Figure 3. For the exit pupil/Fresnel spacing used in this figure, i.e., a spacing wherein the exit pupil is in the front focal plane of the Fresnel structure, these rays converge at the back focal point of the lenslet array, as noted by the Examiner. However, as discussed at page 5, lines 2-3, of the specification, in the general case, for this spacing, rays from the exit pupil will converge in the back focal plane of the lenslet array, not just at the focal point.

(c) an opaque layer comprising a plurality of holes, said holes being at locations which correspond to the images of the exit pupil formed by the combination of the Fresnel structure and the lenslet array.

As is evident, this claim does not claim a projection lens. Rather, it claims a rear projection screen "for use with a projection lens" and then refers to a characteristic of the projection lens, i.e., the projection lens' exit pupil, to define part of the structure of the claimed screen, namely, the locations of the holes in the screen's opaque layer.

Such claiming by reference to a device with which a claimed apparatus is used has been specifically approved by the Court of Appeals for the Federal Circuit. Thus, in In re Stencel, 828 F.2d 751, 4 USPQ2d 1071 (Fed. Cir. 1987), the claim at issue related to a "driver" for use with a particular type of "collar" (specifically, a collar having "plastically deformable lobes") with the characteristics of the driver being defined in terms of the characteristics of the collar. In reversing the Patent Office's rejection of the applicant's claim, the Federal Circuit wrote:

The Commissioner argues that the failure of the lobes of the collar by radial compression and the resultant locking of the collar and pin together is not a distinguishing feature of the driver, but of the collar. The Commissioner cites *In re Best*, 562 F.2d 1252, 195 USPQ 430 (CCPA 1977), and *In re Swinehart*, 439 F.2d 210, 169 USPQ 226 (CCPA 1971), for the proposition that the description of the driver in the claims is merely functional, and that its patentability must be determined against all embodiments of drivers in the prior art.

Appellant points out that the driver as claimed is indeed limited as to structure, the limiting structure being defined by the structure of the collar. For example, the driver is described in claim 1 as requiring: "the minimum distance between each flat and the rotational axis corresponding substantially to the radius of the collar at the location of the lobes after their plastic deformation".

As a matter of claim draftsmanship, appellant is not barred from describing the driver in terms of the structure imposed upon it by the collar having plastically deformable lobes. The framework -- the teachings of the prior art -- against which patentability is measured is not all drivers broadly, but drivers suitable for use in combination with this collar, for the claims themselves are so limited. (4 USPQ2d at 1073; emphasis added.)

In view of this settled law, appellant respectfully submits that Claim 1's reference to the projection lens' exit pupil is entirely proper and does not run afoul of the §112, ¶2, requirement that an applicant present "claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention." Accordingly, the Examiner's rejection of Claim 1 and its dependent claims under 35 USC §112, ¶2, based on Claim 1's reference to a projection lens and, in particular, to the exit pupil of a projection lens, is in error and should be reversed.

Turning to the issue of whether the exit pupil referred to in Claims 1 and 13 is the projection lens' exit pupil, the answer to the Examiner's question is simple -- the exit pupil referred to in those claims is unquestionably the projection lens' exit pupil.

First, the language of Claim 1 and Claim 13 specifically ties the "exit pupil" to the projection lens. Thus, Claim 1 reads "a projection lens which has an exit pupil" and Claim 13 reads "a projection lens having an exit pupil."

Second, the only exit pupil referred to anywhere in the specification is the projection lens' exit pupil. The Examiner's speculation that the exit pupil could be "the exit pupil of the Fresnel lens and lenslet array combination" (10/29/04 final Office Action at page 3) has no basis in fact -- there is simply no reference to such an exit pupil in this case.

Accordingly, the Examiner's assertion that the references to an exit pupil in appellant's Claims 1 and 13 lack clarity is plainly in error and should be reversed.

With regard to the third §112, ¶2, issue, i.e., whether the phrase "said holes being at locations which correspond to the images of the exit pupil formed by the combination of the Fresnel structure and the lenslet array" used in Claims 1 and 13 refers to a point or an area, the answer to this question is again straightforward -- the phrase refers to areas.

From basic optics, a projection lens' exit pupil plainly has an area. Accordingly, images of the exit pupil formed by a Fresnel structure and a lenslet array will be areas, not points. The Examiner's reference to focal points is believed to arise from a

misreading of appellant's Figure 3. As discussed in footnote 1 above, this figure shows only the rays arising from an on-axis point at the center of the exit pupil. For the specific exit pupil/Fresnel structure spacing illustrated in Figure 3, those rays converge at the focal points of the lenslet array. However, as discussed at page 5, lines 2-3, of appellant's specification, in the general case, for this spacing, rays from the exit pupil will converge in the back focal plane of the lenslet array, not just at the focal point. It is these rays from off-axis points which lead to holes which are areas, rather than just points.

Thus, as with the first and second §112, ¶2, issues, appellant respectfully submits that the Examiner's third §112, ¶2, issue is without merit and should be reversed.

C. THE VAN DE VEN PATENT DOES NOT DISCLOSE OR SUGGEST THE SUBJECT MATTER OF APPELLANT'S CLAIMS

Put simply, the van de Ven patent does not anticipate or render obvious any of appellant's claims because (1) the patent does not at any point discuss exit pupils and (2) under the applicable law, the Examiner has not shown that van de Ven inherently discloses a projection screen which has holes at locations which correspond to the images of a projection lens' exit pupil formed by the combination of a Fresnel structure and a lenslet array.

The Examiner seeks to overcome van de Ven's silence with regard to exit pupils with the following argument:

The applicant argues that there is no discussion of an exit pupil in van de Ven and therefore does not anticipate the claims. A rear projection screen will form images from the exit pupil of the projection lens. If it did not it would not function to project the images from the projector. Van de Ven is a valid patent and is presumed not to be inoperable. Where the images are directed (specifically at the holes of the opaque layer) is discussed in the 102 rejection supra. (10/29/04 final Office Action at pages 5-6.)

The 102 rejection referred to in this passage reads as follows:

Claims 1, 6-7, 11-13, and 19 are rejected under 35 U.S.C. 102(b) as being anticipated by van de Ven (U.S. Patent No. 4,666,248). van de Ven teaches a rear projection screen for a rear projection display comprising a Fresnel lens 20, a lenslet array 17, which may be comprised of anamorphic lenses, apertures 15, and a protective coating layer 11. As discussed in col. 11 [sic; 1], lines 31-35, the screen is used with a convention slide or film projector which will have an exit pupil from which images will be projected. The projected images then enter the Fresnel lens 20 on the light entering side 12 of the screen. The Fresnel lens changes the light beam projected by the exit pupil from a divergent beam to a collimated beam. (col. 2, lines 40-43). The collimated beam then enters the lenses 17 to be converged at the holes 15. (col. 4, lines 46-49). Thus the holes are at a location which correspond to the images of the exit pupil formed by the combination of the Fresnel structure and the lenslet array. As described at col. 1, lines 67 to col. 2, line 2 this is done for the purpose of ensuring "that a maximum amount of light from the primary image-source reaches the viewing space and which minimizes reflections of ambient light to the viewing space." (10/29/04 final Office Action at pages 3-4.)

The problem with the Examiner's argument is that the referenced passages of van de Ven do not say what the Examiner asserts they say. Thus, the passage at column 1, lines 31-35, simply provides general background as to rear projection screens:

A rear-projection screen is employed inter alia in cases where a picture or scene is to be projected in an illuminated environment by means of a conventional slide or film projector or a magnified [sic] image of a picture or a scene on a cathode-ray tube is to be formed as an alternative to a super-large cathode-ray tube.

Plainly, this passage has nothing to do with exit pupils.

The next passage referenced by the Examiner appears at column 2, lines 40-43 of van de Ven and reads:

This Fresnel lens constitutes a directional correction element which transmits the divergent signal beam to the lens structure as a substantially parallel beam.

The Examiner would interpret this passage as somehow dealing with exit pupils ("The Fresnel lens changes the light beam projected by the exit pupil from a divergent beam to a collimated beam"). But that is not what the passage says. It refers to a

"divergent signal beam" and does not set forth any relationship between that beam and an exit pupil. Indeed, if anything, the phrase "signal beam" suggests that the light is being considered as it exists at the object, not at an exit pupil.

The next passage of van de Ven cited by the Examiner fares no better. That passage reads:

At its front the foil 16 is provided with a light-absorbing layer 14 in which transparent apertures 15 are formed in which the light incident on the lens elements 17 is focussed [sic]. (van de Ven at column 4, lines 46-49.)

The Examiner argues that this passage should be read to mean that "the holes are at a location which correspond to the images of the exit pupil formed by the combination of the Fresnel structure and the lenslet array." But that is not what the passage says. Again, there is no linkage between exit pupils and hole location in the passage.

Finally, the Examiner's reference to van de Ven's object of maximizing viewing light and minimizing reflections clearly does not teach appellant's claimed relationship between holes of an opaque layer and the exit pupil of projection lens. That passage in its entirety reads as follows:

It is the object of the invention to provide a rear-projection screen whose mechanical and optical properties are substantially independent of one another, which ensures that a maximum amount of light from the primary image-source reaches the viewing space and which minimises reflections of ambient light to the viewing space. (van de Ven at column 1, line 64, to column 2, line 2.)

Appellant believes that the Examiner's arguments are based on the unfounded assumption that van de Ven would not be operable unless his holes were at the locations specified by appellant's claims. Not so -- van de Ven easily can be operable without satisfying appellant's claimed relationship and the Examiner has not and, appellant

submits, cannot show otherwise. Accordingly, the Examiner has not and cannot show that van de Ven inherently discloses or suggests appellant's claimed relationship.²

The CAFC aptly summarized the law regarding inherency in In re Robertson, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999):

If the prior art reference does not expressly set forth a particular element of the claim, that reference still may anticipate if that element is "inherent" in its disclosure. To establish inherency, the extrinsic evidence "must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill." *Continental Can Co. v. Monsanto Co.*, 948 F.2d 1264, 1268, 20 U.S.P.Q.2d 1746, 1749 (Fed. Cir. 1991). "Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient. "Id. at 1269, 20 U.S.P.Q.2d at 1749 (quoting *In re Oelrich*, 666 F.2d 578, 581, 212 U.S.P.Q. 323, 326 (C.C.P.A. 1981).

Under these principles, the Examiner's rejection of appellant's Claims 1-13 and 15-20 under 35 USC §102(b) (Claims 1, 6-7, 11-13, and 19) or 35 USC §103(a) (Claim 7) based on van de Ven is in error and should be reversed.

D. THE COMBINATION OF THE VAN DE VEN PATENT
AND THE GUZMAN PATENT DOES NOT DISCLOSE OR
SUGGEST THE SUBJECT MATTER OF APPELLANT'S CLAIMS

The infirmities in the Examiner's position regarding the van de Ven patent are discussed above. The Guzman patent does not make up for these infirmities.

The Guzman patent relates to a system for making "block" portraits of the type disclosed in a 1973 article in Scientific American. To make such portraits Guzman uses an egg-crate type structure having opaque walls and cells filled with a translucent filler material such as paraffin wax or a combination of paraffin wax and a polyester resin. The cells are shown as having square, rectangular, triangular, or hexagonal perimeters.

² The Examiner's citation of Goldenberg et al., U.S. Patent No. 6,327,083, supports the lack of inherency in van de Ven. The passage of Goldenberg et al. referenced by the Examiner states that a Fresnel lens "is generally designed to image the exit pupil of the projector to the viewing plane," not that it must be or always is designed this way.

Put simply, Guzman has nothing to do with the present invention. Nowhere in Guzman is there any mention of a Fresnel/lenslet/opaque layer combination. In particular, nowhere in Guzman is there an opaque layer with holes. Accordingly, there can be no question that Guzman does not make up for this major deficit in van de Ven. Moreover, being directed to a completely different problem, there is no motivation to combine Guzman with van de Ven.

The Examiner asserts that "Guzman teaches that round apertures and square/rectangular aperture were art known equivalents." (10/29/03 final Office Action at page 5.) Even if this were true, which appellant denies, appellant's claims require more than square and rectangular apertures. In particular, Claims 3, 5, 18, and 20, all of which were rejected based on the van de Ven/Guzman combination, set forth specific relationships between element shapes, fields of view, clear apertures, and focal lengths. Nowhere in van de Ven or Guzman are the relationships of these claims discussed, a fact which the Examiner does not deny. Accordingly, the Examiner's optimization argument cannot fairly be said to be based on the actual disclosure of the references cited.

In sum, appellant respectfully submits that the Examiner's rejection of Claims 2-5, 11-12, 15-18, and 20 under 35 USC §103(a) based on the van de Ven/Guzman combination is in error and should be reversed.

E. NEITHER THE VAN DE VEN PATENT NOR THE COMBINATION OF
THE VAN DE VEN PATENT AND THE GUZMAN PATENT DISCLOSES
OR SUGGESTS THE SUBJECT MATTER OF APPELLANT'S CLAIMS 11
AND 12

As discussed above, dependent Claims 11 and 12 define the size of the elements (19) which make up the screen's lenslet array (13). In particular, these claims require that the elements (19) be at least several times smaller than the magnified image at the lenslet array of an individual pixel (21) for an object which is pixelized (Claim 11) or at least several times smaller than a dot spot in the case of an object which is a cathode ray tube (Claim 12). In this way, moiré effects are eliminated.

The October 29th final Office Action does not address these claims. Nowhere does the Examiner even assert that van de Ven or Guzman discusses this feature of appellant's invention. The reason is simple -- there is no disclosure in either of these references that would lead to these claims.

This being the case, appellant respectfully submits that the Examiner's rejection of Claims 11 and 12 under 35 USC §102(b) based on van de Ven and his rejection under 35 USC §103(a) based on the van de Ven/Guzman combination is in error and should be reversed.

F. THE COMBINATION OF THE VAN DE VEN PATENT AND
THE GUZMAN PATENT DOES NOT DISCLOSE OR SUGGEST
THE SUBJECT MATTER OF CLAIMS 5 AND 18

Dependent Claims 5 and 18 require that the elements (19) which make up lenslet array (13) have a rectangular aperture (see Figure 4) and vertical and horizontal clear apertures (CA_v and CA_H) which provide different vertical and horizontal half fields of view for a common focal length (f') of the lenslets in the horizontal and vertical directions. Such elements allow for full control of the vertical and horizontal fields of view in viewer space with a simple lenslet structure.

The October 29th final Office Action does not specifically address these claims. Nowhere does the Examiner assert that van de Ven or Guzman discloses a lenslet array having rectangular apertures and a common focal length in the horizontal and vertical directions. The reason is simple -- there is no disclosure in either of these references that would lead to these claims.

This being the case, appellant respectfully submits that the Examiner's rejection of Claims 5 and 18 under 35 USC §103(a) based on the van de Ven/Guzman combination is in error and should be reversed.

G. NEITHER THE VAN DE VEN PATENT NOR THE COMBINATION OF THE VAN DE VEN PATENT AND THE GUZMAN PATENT DISCLOSES OR SUGGESTS THE SUBJECT MATTER OF APPELLANT'S CLAIM 10

Dependent Claim 10 is directed to the specific screen structure illustrated in appellant's Figure 1. As shown therein, the screen preferably includes a protective layer having a smooth outer surface (17) and is composed of two subassemblies: a first subassembly which comprises the Fresnel structure (11) and the lenslet array (13) and a second subassembly which comprises the opaque layer (15) and the protective layer. This arrangement can facilitate the manufacture of the screen and produces a robust structure which can resist environmental damage.

The October 29th Office Action does not list this claim under any of the §102 or §103 rejections. The structure called for by this claim is clearly not disclosed or suggested by either van de Ven or Guzman.

Accordingly, appellant respectfully submits that Claim 10 is properly allowable and such action is respectfully requested.³

H. CONCLUSION

For all of the foregoing reasons, appellant respectfully submits that the Examiner's rejections of Claims 1-13 and 15-20 are in error and should be reversed. Such action is thus respectfully requested.

Respectfully submitted,

Date: 7/2/04

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Commissioner of Patents and Trademarks, Washington, D.C. 20231, on the date below.

Date of Deposit: July 2, 2004

Maurice M. Klee 7/2/04
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³ Claim 10 was rejected in the March 11, 2003 non-final Office Action as allegedly anticipated by Cooper, Jr., U.S. Patent No. 3,580,611, but that rejection does not appear in the October 29, 2003 final Office Action.

IX. APPENDIX OF CLAIMS INVOLVED IN THE APPEAL

1. A rear projection screen for use with a projection lens which has an exit pupil, said screen having a light entering side and a light exiting side and comprising in order from said light entering side to said light exiting side:

- (a) a Fresnel structure;
- (b) a lenslet array; and
- (c) an opaque layer comprising a plurality of holes, said holes being at locations which correspond to the images of the exit pupil formed by the combination of the Fresnel structure and the lenslet array.

2. The screen of Claim 1 wherein the lenslet array comprises elements which have a square aperture.

3. The screen of Claim 2 wherein, in viewer space, the screen has a half field of view α given by:

$$\alpha = \tan^{-1}(0.5 \bullet CA/f)$$

where CA and f are, respectively, the clear aperture and the focal length of the elements.

4. The screen of Claim 1 wherein the lenslet array comprises elements which have a rectangular aperture.

5. The screen of Claim 4 wherein, in viewer space, the screen has a vertical half field of view α_v given by:

$$\alpha_v = \tan^{-1}(0.5 \bullet CA_v/f)$$

and a horizontal half field of view α_H given by:

$$\alpha_H = \tan^{-1}(0.5 \bullet CA_H/f)$$

where CA_v , CA_H , and f are, respectively, the vertical clear aperture, the horizontal clear aperture, and the focal length of the elements.

6. The screen of Claim 1 wherein the lenslet array comprises anamorphic elements.

7. The screen of Claim 6 wherein, in viewer space, the screen has a vertical half field of view α_V given by:

$$\alpha_V = \tan^{-1}(0.5 \bullet CA/f_V)$$

and a horizontal half field of view α_H given by:

$$\alpha_H = \tan^{-1}(0.5 \bullet CA/f_H)$$

where CA, f_V , and f_H are, respectively, the clear aperture, the vertical focal length, and the horizontal focal length of the elements.

8. The screen of Claim 1 further comprising a protective layer on the light exiting side of the opaque layer.

9. The screen of Claim 8 wherein the Fresnel structure, the lenslet array, the opaque layer, and the protective layer are arranged as subassemblies.

10. The screen of Claim 9 wherein the Fresnel structure and the lenslet array are arranged in one subassembly and the opaque layer and the protective layer are arranged in another subassembly.

11. The screen of Claim 1 wherein the screen is for use with a pixelized panel and the lenslet array comprises elements whose size is at least several times smaller than the magnified image of a pixel produced at the array by the projection lens.

12. The screen of Claim 1 wherein the screen is for use with a cathode ray tube and the lenslet array comprises elements whose size is at least several times smaller than the magnified image of a dot spot of the cathode ray tube produced at the array by the projection lens.

13. A rear screen projection system comprising a projection lens having an exit pupil and a rear projection screen which has a light entering side and a light exiting side and comprises in order from said light entering side to said light exiting side:

(a) a Fresnel structure;

(b) a lenslet array; and

(c) an opaque layer comprising a plurality of holes, said holes being at

locations which correspond to the images of the exit pupil formed by the combination of the Fresnel structure and the lenslet array;

wherein the Fresnel structure has a front focal distance and the distance from the exit pupil of the projection lens to the screen is equal to said front focal distance.

15. The rear screen projection system of Claim 13 wherein the lenslet array comprises elements which have a square aperture.

16. The rear screen projection system of Claim 15 wherein, in viewer space, the screen has a half field of view α given by:

$$\alpha = \tan^{-1}(0.5 \bullet CA/f)$$

where CA and f are, respectively, the clear aperture and the focal length of the elements.

17. The rear screen projection system of Claim 13 wherein the lenslet array comprises elements which have a rectangular aperture.

18. The rear screen projection system of Claim 17 wherein, in viewer space, the screen has a vertical half field of view α_v given by:

$$\alpha_v = \tan^{-1}(0.5 \bullet CA_v/f)$$

and a horizontal half field of view α_H given by:

$$\alpha_H = \tan^{-1}(0.5 \bullet CA_H/f)$$

where CA_v , CA_H , and f are, respectively, the vertical clear aperture, the horizontal clear aperture, and the focal length of the elements.

19. The rear screen projection system of Claim 13 wherein the lenslet array comprises anamorphic elements.

20. The rear screen projection system of Claim 19 wherein, in viewer space, the screen has a vertical half field of view α_v given by:

$$\alpha_v = \tan^{-1}(0.5 \bullet CA/f_v)$$

and a horizontal half field of view α_H given by:

$$\alpha_H = \tan^{-1}(0.5 \bullet CA/f_H)$$

where CA, f_v , and f_H are, respectively, the clear aperture, the vertical focal length, and the horizontal focal length of the elements.